Dr. Peterson
Atlanta Rotary Club Speech
Monday, March 4, 2013

Creating a Climate for Innovation

It is a pleasure to be here and to be invited to speak in this, your 100th anniversary year of the Rotary Club of Atlanta. There are many Georgia Tech-Atlanta Rotary connections, but the one that is top of mind for me is Georgia Tech graduate Ivan Allen Jr., the son and namesake of your founding president. A month from today we will again honor his leadership and courage by awarding the *Ivan Allen Jr. Prize for Social Courage* to Congressman John Lewis, an icon of the civil rights movement.

The last time I was here was December of 2009 – I had been president of Georgia Tech for less than a year. In 27 days Val and I will celebrate our four-year anniversary at Georgia Tech, and it has been a great ride so far. It is a true honor to be able to lead one of the finest technological research universities in the country and perhaps the world, but as you might guess, because of Tech's national leadership in so many areas it can be a bit fast paced. The thing that is most challenging is just trying to keep up with all the technological developments going on at Georgia Tech.

When I first came to Tech, I looked forward to the time when I would have been here a year or two and would know much of what was going on. After four years now, you would think that I would be on top of all the new technology at Georgia Tech, but that is not the case. In fact, I feel like I am losing ground.

When I started four years ago, Facebook was only five years old, Twitter had just started to become popular and Groupon, Instagram, Pinterest and Facetime had not been invented yet. Today Instagram has more than 190 million users and Groupon is valued at over $1.6 billion.

To give you a sense of how fast technology is moving, last summer EMC Corporation announced the results of their study, “Extracting Value from Chaos.” The study found that the world’s information is more than doubling every two years – for those of us in education that means that our incoming freshmen this fall will have to learn twice as much – twice as fast — as students who graduate this May.

Today over 30 percent of the world’s population uses the Internet – more than 2.1 billion people. Intel recently released the results of a study titled “What happens in an Internet minute?” Here’s what they found:
In one minute on the Internet

- 639,800 GB of global IP data is transferred – that is 1 percent of the information stored in the Library of Congress.
- 2 million Google searches are initiated
- 6 million Facebook views are conducted, and
- 204 million emails are sent

That’s every minute of every day.

The Internet has changed our relationships and the way we communicate. In 2010 NPR reported a study that showed one in four couples met online. It is interesting to note that another study reported more than 80 percent of people misrepresent their height, weight, or age in their online profiles, but they are usually small exaggerations in case they actually meet the person face to face!

In January SmartCompany released a finding that six out of every ten people alive on Earth now have a mobile phone, and one in four has a smartphone – and we cannot stop using them. I suspect that 10 percent of you are currently sending or receiving texts or emails right now and another 20 percent are wishing I would hurry up and finish so you can get to your messages!

Smartphones are used for everything imaginable — at Georgia Tech, the saying "There's an App for that" could be changed to "We've designed an App for that." Our students have designed smartphone apps that track the campus trolley in real time so that you know exactly how long you'll be waiting.

Georgia Tech researchers have designed Remotoscope, a software App that turns an iPhone into an otoscope so that parents can take a picture or video of their child's eardrum and send the images digitally to the pediatrician to determine if the child has an ear infection. Between raising our four children and nine foster children, we could have used that!

I continue to be impressed with all the remarkable things that are happening at Tech. Whether it's through teaching, research, or how we impact in the community, it all comes back to innovation.

That's what I'd like to focus on this afternoon:

- how we are preparing our students to be leaders and innovators,
- how innovation can help to strengthen our economy through the growth of an innovation ecosystem here in Atlanta, and finally,
- how innovation is changing the role of our universities and the way we teach.

The role of institutions of higher education is rapidly changing and in fact may be at a transformational point in its development. There are three major changes underway. First, it is no longer acceptable for universities to just enroll good students and then graduate them. Today, institutions like Georgia Tech are expected to ensure that our graduates are both employable and prepared to adapt and lead in our ever-changing world.

Second, while there has long been an expectation that our research universities would perform fundamental research, today there is an expectation that they will move that research to the consumer and enhance the economic development of the region and

nation to create more jobs. Third, being a regional or national institution is no longer acceptable. We are expected to be global in nature and to provide lifelong learning opportunities for the world using advanced technology. And to do it for free!

A month or so ago you may have seen the Sunday *New York Times* opinion piece on robots that interact with humans. It included a huge photo of Simon, a humanoid robot being developed at Georgia Tech.

I've met Simon. He, or perhaps "it" understands language and uses social skills to respond. It nods or tilts its head, and if it doesn't understand, it raises its hands to question. It can sense if you are not paying attention and take actions to regain your interest – it is a little spooky, sometimes reminding me of my fourth grade teacher, Mrs. Kabler.

Preparing our students to be leaders and innovators

At Georgia Tech, we are working to create a climate of innovation across all areas of study. While you would expect a focus on innovation in one of the nation's largest and best engineering programs, innovation is also much a part of our outstanding programs in computing, architecture, liberal arts, sciences, and business.

One of the fastest growing clubs on campus is the Makers Club that manages the Invention Studio space.

One way we encourage innovation is industry-sponsored student competitions. For example, a program called "Ideas to Serve" is part of our Institute for Leadership and Entrepreneurship in the Scheller College of Business. It is a competition for current students and recent alumni who have early stage product ideas or venture concepts geared towards creating a better world.

Or the InVenture Prize — On March 13 Georgia Public Broadcasting will air live the finalist competition for this competition which creates incentives for undergraduate student innovation in a fun, high-profile event.

This year 164 inventors participated. The show, aired live on Georgia Public TV on March 13, will feature the finalists who present a brief overview of their inventions and answer questions from a panel of judges. One of this year's finalists developed AnemoCheck, a point-of-care, patient-operated diagnostic test for anemia. Another developed a line of fully automated robotic dog toys, and another, a toaster that perfectly toasts your bread by color. The first place winner receives a $20,000 cash prize, sponsored by Google, and second place receives $10,000, along with a free U.S. patent filing by Georgia Tech's Office of Technology Licensing, valued at $20,000. Winners are automatically accepted into the Summer 2013 class of Flashpoint, Georgia Tech's startup accelerator program. We're committed to helping students, faculty and staff, and individuals in the community transform their intellectual property to drive innovation.

Through activities such as this, Tech is the third leading developer of patents in the state. AT&T is first, and Kimberly Clark is second. I said that in the presence of a Kimberly Clark executive one time, and he said we might as well say that Georgia Tech is second because they have so many Georgia Tech graduates working at Kimberly Clark! It is interesting to note that 70 percent of Georgia Tech's invention disclosures list at least one student among the inventors.

Strengthening our economy through the growth of an innovation ecosystem

At Tech we are committed to helping not only our students, faculty and staff be innovative, but also people from all across the state. Georgia Tech is taking a leading role in creating an Innovation Zone in Midtown.

We are helping people transform their intellectual property to drive innovation, attract and create new business and transition ideas from the concept stage to the marketplace.

We are educating students who will become the intellectual talent that business and industry seek. Our research universities play a key role in regional and statewide economic development.

Technology Square is a high-energy hub, creating an exciting environment in which innovation can flourish. What was a blighted location just ten years ago is now fast becoming the center of the entrepreneurial community in the Southeast. The mixed-use area is a testament to what is possible through a partnership between higher education, the state, business and industry.

In fact, last month *USA Today* ran a feature on Atlanta's aspirations to be an innovation hub. It cited that the National Venture Capital Association now ranks Atlanta as the No. 12 city in the nation for tech startups.
Helping us move toward the top ten is the Enterprise Innovation Institute. EI^2 is Georgia Tech's primary business outreach organization, providing a comprehensive program of assistance to business, industry, entrepreneurs, and economic developers.

EI^2 accelerates start-up formation through education programs, assists start-ups through incubators, and
amplifies commercialization impact through support programs. Today there are more than 40 start-ups in the Centergy One building in Tech Square.

Small businesses are core to our economic future, as they represent 97 percent of all employers and employ nearly half of the private sector workforce. By working with them, we're helping to create jobs in Georgia.

Last summer, in recognition of EI_2's experience with commercialization the National Science Foundation named Georgia Tech a founding node of its Innovation Corps, or I-Corps network along with Stanford and the University of Michigan.

EI_2 commercialization specialists have already taught 75 NSF teams from around the country, and Georgia Tech's Advanced Technology Development Center, or ATDC, has helped launch more than 140 companies that, together, have created thousands of jobs and attracted more than $1 billion in investment.

Last week Georgia Tech announced that we are strengthening and realigning resources in ATDC, including expanding the staff of technology catalysts and entrepreneurs-in-residence, adding new facilities to support specialized start-ups, and expanding office and incubator space at ATDC headquarters in Tech Square.
Looking forward, Georgia Tech has plans on the drawing board for a High Performance Computer Center. It would support academic researchers and also offer opportunities for private companies who need access to powerful but expensive computers.

As another component of our innovation ecosystem, Georgia Tech partners with the Georgia Department of Economic Development to attract new business and industry to the state. In November, Panasonic officially opened its new auto innovation center in Centergy One in Tech Square. Panasonic benefits from having access to Tech students and graduates who are helping to develop the next generation of in-vehicle multimedia infotainment systems. Penguin Computing recently opened a sales, support and engineering office in Centergy One. Just last week it was announced that the health IT firm, athenahealth, will locate here, bringing more than 700 jobs to Midtown. They were drawn to the area because of its walkability, bike trails, a young population, and proximity to Georgia Tech.

Georgia Tech's Institute for People and Technology, or IPaT, and GTRI are in ongoing discussions with Midtown Alliance about ways to expand partnerships, including turning Midtown into a "living laboratory" as part of its growth as an innovation district.

Georgia Tech, along with several other area universities, serves as a magnet for attracting business and industry, and we should continue to leverage that critical economic strength.

How innovation is changing the role of our universities and the way we teach

While we are teaching our students to be innovative, we are also working to be innovative in how we teach our students. Rather than focusing on traditional ways of teaching, we present students with realistic and complex problems and challenge them to develop solutions in self-directed learning.

Historically several things have had a profound effect on higher education –

- the development of the Socratic method,
- the Morrill Act, which established the Land Grants universities;
- the GI Bill, which allowed tens of thousands of veterans to pursue a college education;
- and Sputnik, which caused a whole generation to refocus their education on engineering, mathematics, and science.

Recent developments on technology-assisted learning may prove to be just as important as it is dramatically changing the way we educate our students. Online education not only enhances a traditional college education, but also helps people to participate in lifetime learning.

Today, Georgia Tech's Distance Learning offers 40 areas of study to students ages 16 to 85. Our Distance Calculus Program, for example, provides advanced level calculus

courses to hundreds of students throughout Georgia who might not have those courses in their high schools.

Probably the most dramatic change to date is the creation of MOOCS, or Massively Open Online Courses. MOOCS are a grand experiment, and Georgia Tech is one of the leaders nationally.

In January I participated in the World Economic Forum in Davos, Switzerland. One of the sessions I attended was a panel moderated by *New York Times* columnist Thomas Friedman about online education. Included on the panel were Bill Gates, the president of MIT, and the co-founder of Coursera and Udacity two of the three principal, cyber-based educational platform companies with which Georgia Tech has partnered to develop these MOOCS.

The most intriguing part of the session was Tom Friedman's interview with a 12-year-old girl from Lahore, Pakistan. Friedman commented to her that he was more nervous than she was, because if he blew an interview with a 12-year-old it would appear all over the Internet and he would never hear the end of it.

You may remember that this girl's story was covered in *Time* magazine last fall as part of a focus called "Reinventing College." Khadija Niazi gained international notoriety because in the midst of her college-level physics exam, the Pakastani government shut down access to YouTube to block an anti-Muslim film trailer. She posted her predicament on her class discussion board and within an hour, a young man from Malaysia posted detailed descriptions of the material in each video.

A class participant from Portugal downloaded all of the videos and uploaded them to an uncensored photo-sharing site. The next day, with the help of online classmates, Khadija was able to complete the test and passed the college-level class with highest distinction.

A year ago at Tech we opened our first MOOC – 20,000 the first day. Today we have 11 courses with over 200,000 students enrolled – most in cooperation with Coursera. Since it began in April 2012, Coursera has enrolled 1.57 million students. While many most likely won't finish the courses, they have access to some of the best professors, course material and opportunities for online interaction around the globe.

This raises a few questions. *First, why is this happening now?* I think it is an interesting confluence of events. While the technologies have existed for some time what has changed is the comfort level of online activities, which has dramatically increased. The popularity of online interaction can be seen in Facebook and Twitter. I don't have any friends I have never met, but today's students are very comfortable online, making friends, sharing information and chatting.

The next question is, "If all of this coursework is available online, will institutions like Georgia Tech continue to exist?" The educational experience consists of three main components: classroom instruction, the project and lab experience, and student life.

Classroom instruction can be replicated online relatively easily because of today's students' comfort level with online conversations and relationships, so too can project work.

Laboratory work is a little more difficult to replicate, because of the face-to-face interactions that occur with faculty, staff and other students are more and more being replaced by online interactions, this too will change.

Third, "If students can get the course material online for free, then what does tuition pay for, particularly at private institutions that charge $40 or $50 thousand per year?"

A good way to think about this is the Super Bowl. If you go to the game, you get to fight through the traffic,
pay a ton of money to sit among a bunch of people you don't know, and pay more money for a limited choice of food. If you watch it at home, you get to be among friends with whatever food and drinks you want.
You get instant replay and the Super Bowl commercials. But people still go to the games. Why? Because there is something about the game experience, about being there live, about the atmosphere.

Our challenge in higher education is to think carefully about how we can create an atmosphere that has value added – that makes people want to be there.

Students don't just want lectures; they want an opportunity to engage with one other and with the professors.
This is changing the role of the faculty member in the classroom.

Finally, "If students can go online to see the best physics lectures by the best known scientists, what is the faculty role?
We are exploring hybrid approaches that blend the best of an in-person experience with the convenience of technology, including opportunities for virtual collaboration and discussion. And, we are working to create and nurture a sense of community. It's about creating a network of people, and ensuring the quality of the experience and the interactions.

It is an exciting time of changes and new opportunities. For those of you who thought you could never get into Georgia Tech, now's your chance — through a MOOC!

Thank you for inviting me to be with you this afternoon.

Q&A Portion

Sequestration:

How will sequestration affect Georgia Tech?

- Because we don't know exactly how federal agencies will implement the required cuts, we don't know the specific impact on Georgia Tech. But we do know that it will be negative.
- There will be fewer research awards, which means fewer discoveries, fewer graduate students will be educated, and fewer jobs.
- It also means it will be tougher to leverage our federal dollars to compete for funding from industry and even state government.

Example:

We talked about the iPhone today. It wouldn't exist without federally funded research. (GPS, touch screen, liquid crystal display or LCD monitor, and rechargeable lithium-ion batteries all came out of federally-sponsored research)